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THE LONDON AGREEMENT AND THE COST OF PATENTING IN EUROPE

BRUNO VAN POTTELSBERGHE DE LA POTTERIE AND MALWINA MEJER

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Bruno van Pottelsberghe de la Potterie[α] *and Malwina Mejer*[∇]

[α] Bruegel and Université Libre de Bruxelles (ULB), SBS-EM, ECORE (ECARES), and CEPR, London. CEB and DULBEA – bruno.vanpottelsberghe@ulb.ac.be

[∇] Research Assistant, Bruegel and Université Libre de Bruxelles (ULB), SBS-EM, ECORE (ECARES) - malwina.mejer@ulb.ac.be

Abstract: This paper analyses the consequences for the European Patent System (EPS) of the recently ratified London Agreement (LA), which aims to reduce the translation requirements for patent validation procedures in 15 out of 34 national patent offices. The simulations suggest that the cost of patenting has been reduced by 20 to 30 percent since the enforcement of the LA. With an average translation cost saving of €3,600 per patent, the total savings for the business sector amount to about €220 millions. The fee elasticity of patents being about -0.4, one may expect an increase in patent filings of eight to 12 percent. Despite the translation cost savings, the relative cost of a European patent validated in six (thirteen) countries is still at least five (seven) times higher than in the United States.

JEL: P14, P51, O34

Keywords: European patent system, London Agreement, patent fees, translation costs, fee elasticity.

1. Introduction

The European Patent Convention (EPC) was ratified more than 30 years ago by seven European countries in order to exploit synergies in the search for prior art and the substantive examination process[1]. The EPC proved to be an impressive success, especially if the number of member states (signatories) and the number of patent applications are considered success factors. The EPC now includes 34 member states and there have been more than 200,000 applications per year since 2006. Despite this apparent success, the European patent system is heavily criticized by various institutions, including firms, universities, national agencies and the European Commission[2]. There are various reasons for these criticisms (see Guellec and van Pottelsberghe (2007) for an in-depth assessment), but one of the most recurrent and pressing relates to the cost and complexity of the European patent system: its high level of fragmentation and its translation requirements make it the most expensive, most complex patent system in the world. Indeed, despite the explicit 1978 objective of creating a Community Patent (one patent valid for all member states), the European Patent system is still fragmented: once a patent is granted by the European Patent Office (EPO) it must be enforced (i.e., translated, validated and renewed each year) in each desired national jurisdiction.

An important step forward has recently been taken, however. Out of the 34 member states 15 (as of September 2008) have ratified the so-called "London Agreement" (LA), which drastically reduces the translation requirements when patents are validated at national patent offices. The objective of this paper is to analyse the consequences of this agreement on the cost of patenting in Europe and its potential implications for the behaviour of applicants. first, the paper simulates the cumulated fees and translation costs associated with a patent, before and after the London Agreement. In addition to changes in costs an international comparison is then performed to assess whether important differences still prevail. The paper then investigates to what extent the cost reductions might affect the patenting behaviour of applicants.

The paper is structured as follows. The next section describes the London Agreement and the variations that have been adopted by some member states. Section 3 presents the simulations of the cost of patenting before and after the London Agreement. International comparisons of relative and absolute patenting costs are performed in section 4. Section 5 is devoted to the potential consequences on the number of patent filings and on cost savings. The last section concludes.

The results suggest that the cost of patenting has reduced by 20 to 30 percent following the implementation of the London Agreement. Had the London Agreement been ratified by all member states, the cost of patenting would have been reduced by 40 to 60 percent (depending on the number of targeted states for protection). With an average translation cost saving of €3,600 per patent, the total savings for the business sector amount to about €220 millions. The relative cost of a European patent is however still at least five times higher than in the US. The fee elasticity of patents being of about -0.4, one can expect an increase in patent filings of eight to 12 percent.

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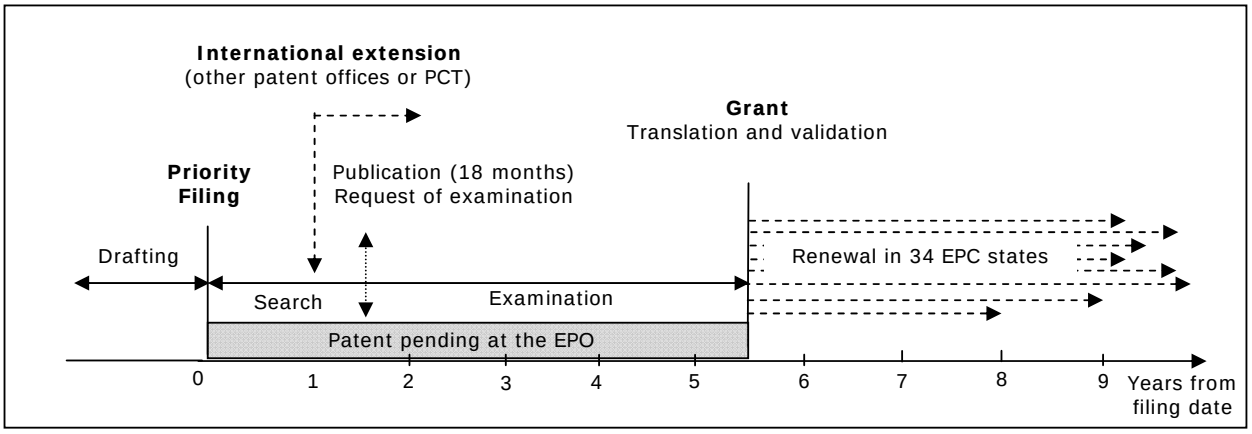
[1] The seven signatory states in 1978 were Belgium, France, Germany, Luxembourg, The Netherlands, Switzerland and The United Kingdom.

[2] For instance, Single Market Commissioner Charlie McCreevy in his statement on 3rd April 2007 said: "*Patents are a driving force for promoting innovation, growth and competitiveness but the single market for patents is still incomplete. ... In today's increasingly competitive global economy, Europe cannot afford to lose ground in an area as crucial as patent policy*." www.iht.com/articles/2007/04/03/business/ip.php

2. The complexity of the European Patent System

The Community Patent has been a bone of contention for 30 years and still remains a 'work in progress'. The current system is based on a multilateral patent treaty – the European Patent Convention (EPC), signed in 1977. The EPC provides a centralised application and examination procedure for European patents (cf. Figure 1). A European patent (EP) application has to be filed in one of the European Patent Office (EPO) official languages (English, German or French), the so called *procedural language*[3]. The examination process begins with a search report that identifies the prior art relevant to the application. Once the search report is published, not later than 18 months after the priority date[4], the applicant has six months to request a substantive examination of its patent, i.e., an analysis of whether there is an inventive step. If the invention conforms with the requirements of the EPC (novelty, non-prejudicial disclosures, inventive step, and industrial applicability) the application is granted[5].

Figure 1: Application and renewal procedure at patent offices[1]



(1) Publication of applications take place no longer than 18 months after the priority date (Paris Convention for the Protection of Industrial Property of 1883). Renewal, translation and validation occurs in all desired countries for protection amongst the 34 EPC contracting states.

Once granted, the European patent has to be validated and enforced in each desired member state for an effective protection. This step requires the filing of a translated patent document and the payment of validation fees in the EPC contracting states where the assignee wants to enforce its rights[6]. Furthermore, annual renewal fees are payable each year (for up to a total of 20 years from the priority date) on a country-by-country basis. The failure in a particular country to provide a translated document, to pay the validation fees, and to pay the renewal fees each year makes the patent irreversibly lapse and fall into the public domain.

The fact that 'only' national patents (i.e., EPO granted patents validated in a national patent office) provide an effective protection mechanism in each EPC member state contributes to the

[3] Patent applications can also be filed in the national language of the EPC contracting state. However, the translation into one of the three EPO official languages has to be submitted within three months of the filing date.
[4] i.e., the first time an application is filed, generally at a national patent office; cf. Stevnsborg and van Pottelsberghe (2007) for an exhaustive description of the various routes that can be used to reach the EPO.
[5] Novelty, non-prejudicial disclosures, inventive step, and industrial applicability requirements are set according to art. 54, art. 55, art. 56 and art. 57 of the EPC, respectively.
[6] Art 137 cf. of the EPC.

prohibitive costs of the system. Unlike with other patent offices around the world, payments of national validation fees and annual renewal fees, the frequent translation requirements, and the national enforcement practices (e.g., litigation processes and identification of infringers) must be multiplied by the number of countries chosen by the applicant. In case of infringement suspicions in several countries the enforcement mechanism reaches a high level of complexity, as the application and interpretation of the EPC is specific to each national court (which has exclusive rights to judge on validity and infringement cases)[7.] Existing differences between jurisdictions enhance the risk that in case of multiple litigations relating to a single patent, some national courts may reach 'opposite decisions' regarding the same patent, as illustrated by Mejer and van Pottelsberghe (2008) with several case studies on parallel litigations.

Two recent initiatives have been proposed within the EPC legal framework to simplify the existing situation. The first one is the so-called London Agreement (LA) and aims at reducing translation costs. The second initiative is the European Patent Litigation Agreement (EPLA). It tackles the problem of legal uncertainty and aims at implementing a centralised European court for patent-related litigation. The objective of the EPLA is to provide a more homogeneous interpretation of the validity and of the scope of a European patent. The London Agreement and the EPLA are both optional for each of the 34 EPC member states. Whereas the former has been ratified by 15 countries so far (with entry into force as of the 1st of May 2008), the latter is still subject to intense negotiations.

This paper focuses on the consequences that the London Agreement (LA) may have for the cost of patenting in Europe and for the patenting behaviour of applicants. The simplified translation rules set in the LA apply to patent applications published in the European Patent Bulletin after the 1st of May 2008. The newly reduced translation requirements only apply in the 15 following signatory member states: Belgium (BE), Denmark (DK), France (FR), Germany (DE), Croatia (HR), Iceland (IS), Latvia (LV), Lichtenstein (LI), Luxembourg (LU), Monaco (MC), The Netherlands (NL), Slovenia (SI), Sweden (SE), Switzerland (CH), and the United Kingdom (UK)[8.]

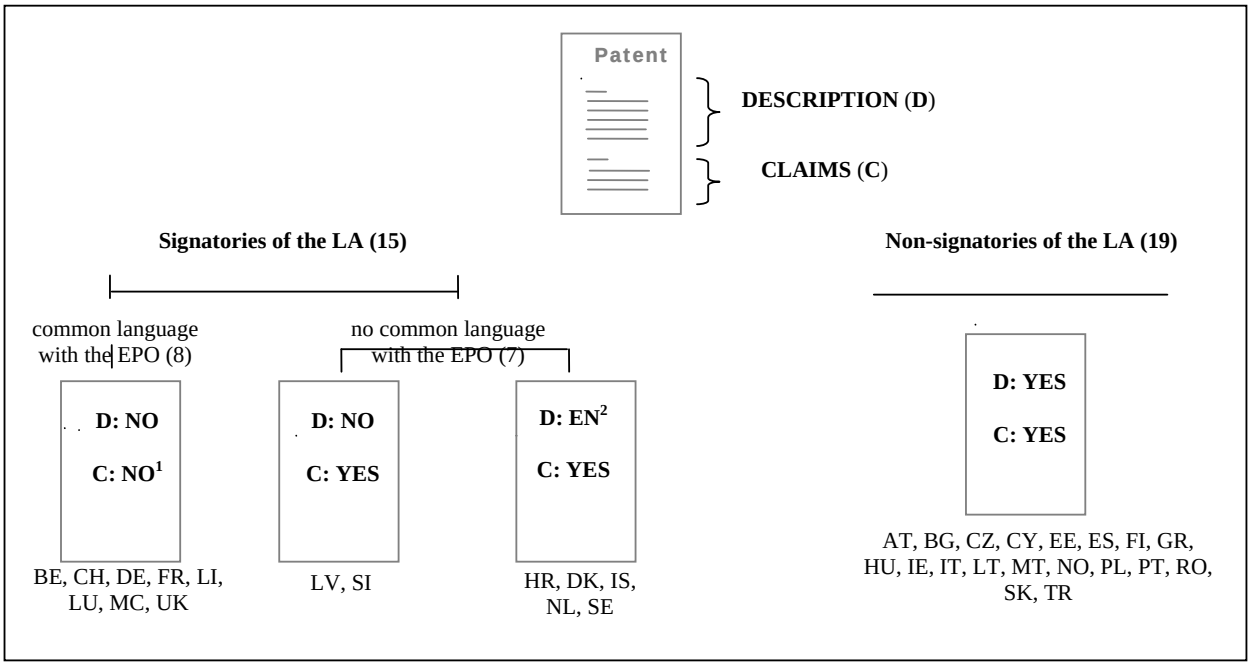
The country specificities regarding translation requirements under the LA are illustrated in Figure 2. The signatory states that have an official language in common with one of the official language of the EPO agree to dispense completely with translation (art 1(1) of the LA). The other signatory states have adopted different facets of the London Agreement, especially for the two main sections of a patent (the description section and the claims section). The states having no official language in common with one of the official languages of the EPO require a translation of claims into one of their own official languages (art 1(3) of the LA), and optionally they may require the description to be translated into the prescribed language of the EPO (art 1(2) of the LA). In case of litigation, a full translation of the European patent into an official language of the state in which the alleged infringement took place is necessary prior to the suit (art 2 of the LA). The countries that have not signed the London Agreement still require the translation of the whole patent into

[7] Cf. Mejer and van Pottelsberghe (2008), who provide several case studies of litigations that yielded opposite results in various countries. One of the patent infringements lawsuit concerns Document Security Systems (DSS) v European Central Bank (ECB). The US company DDS sued the ECB in August 2005 at the European Court of First Instance, alleging that the euro banknotes produced by the ECB infringe its European patent EP 0455750 relating to anti-counterfeiting technology (DDS accused the ECB of infringing its technology in the production process of banknotes). Differences across jurisdictions led to uphold the patent at the court of first instance in Germany and the Netherlands but it was invalidated in France.

[8] Note that the entry into force of the London Agreement was conditional on ratification by at least eight countries, including France, Germany, and United Kingdom (London Agreement, 2000).

their official language(s).

Figure 2: Translation requirements in EPC member states, as of the 1st of May 2008



(1) The language of the European Patent at grant is the 'procedural language' (one of the EPO official languages i.e. English, French or German). However, the EPO requires a patentee to provide a translation of claims into the two other official languages of the EPO before the publication in the European Patent Bulletin;
(2) The countries having no official language in common with one of the three EPO official languages may require the translation of the description to be supplied in the official language of the EPO prescribed by that state.

In practice, for the validation of the European patent in Belgium, Germany, France, Luxembourg, Monaco, the United Kingdom and Switzerland/Lichtenstein, no translation is required, for validation in Latvia and Slovenia only the claims must be translated into their national language, as they accept descriptions written in any of the EPO official languages. Five countries (Croatia, Denmark, Iceland, The Netherlands and Sweden) require claims to be translated into their official languages and the descriptions to be translated into English. Austria and Ireland remain the only countries that have a language in common with the EPO but have not yet ratified the London Agreement.

3. The cost impact of the London Agreement

This section provides simulations of the cost reductions induced by the London Agreement. We begin with a methodological description and then demonstrate the relative cost savings under various scenarios (number of countries and types of expenditures accounted for).

3.1. Methodology and working hypotheses

Expenses associated with the patent granting process and with patent maintenance can be decomposed into four categories (van Pottelsberghe and François, 2006):

1. **Procedural costs** are composed of fees payable to the patent office up to grant, namely: filing fees, search fees, patent publication fees, examination fees, grant fees (for issuing a patent) and validation fees[9]. In addition to those fixed fees, patent offices sometimes charge claim-based and page-based fees to limit the filing of large documents. Additionally, the patent office may charge annual fees for maintaining a patent application that is still pending in the examination process.

2. **Translation costs** occur when the validation procedure requires the applicant to submit a patent translated into the national language of the patent office (cf. Figure 2 for the translation requirements requested by all EPC member states). The actual translation costs incurred depend on two factors: the patent size and the number of countries that are targeted for protection once the patent is granted by the EPO. Estimating those costs is not straightforward as they have two components: (i) a language specific translation cost[10] and (ii) a transaction cost which frequently includes intermediation with patent attorneys.

3. **Maintenance costs** occur after grant and consist of the payment of renewal fees that must be paid in each desired country for a maximum period of 20 years from the priority date. In general, these fees increase over time. Renewal fees are due annually or periodically (North America).

4. **External expenses** are composed of the service costs of legal advice starting from the very first step of drafting a patent application, up to the representation before the patent office, until the patent falls into public domain. While large firms usually have their own intellectual property departments, with officially accredited attorneys, small firms must always rely on external services provided by legal advisors and accredited patent attorneys.

Estimating patent costs is therefore far from straightforward, as several components are not easy to quantify and depend on the patentee's filing strategy (e.g. the patent size, the application route, the quality of external services, the desired speed of examination process, and the targeted geographical scope of protection). Patents that have a large number of claims and pages (i.e., biotechnology patents) generate higher costs than smaller patents (i.e. traditional technologies)[11]. The complexity of the document will influence the number of interactions with the patent office therefore increasing the level of external expenses (as illustrated in Lazaridis and van Pottelsberghe, 2008). Furthermore, the cost of patent enforcement will depend on the desired geographical scope and the level of renewal fees.

[9] Once the European patent is granted, it must be validated in the desired member states to be effectively enforced. Validation fees are paid to national patent offices for the publication of the translated patent.

[10] Harhoff et al. (2008) classify languages according to the level of costs of translations incurred by the patent holder. In general, translations into languages spoken in central and Southeastern Europe are less expensive than translations into the Nordic languages. Ginsburgh (2005) and Fidrmuc and Ginsburgh (2007) provide theoretical and empirical evidence supporting the idea that some languages are more difficult than others, implicitly inducing higher translation costs.

[11] Stevnsborg and van Pottelsberghe (2007) present a typology of filing strategies and discuss their impact on the examination process.

In order to approximate the cost of patenting, two methods can be applied. The first is to conduct a survey among the patenting companies about the costs they incur during the granting process and the costs of keeping their patents in force (this first approach has been performed by Roland Berger (2005) for the companies that have filed at least one patent with the EPO). The advantage of a survey is that it provides a direct evaluation of patenting expenses. However, information obtained from the companies will also reflect their filing strategies, the results being dependent on the sample selection (i.e. small versus large companies, different fields of technology, different routes). In addition, there is no standard accounting approach to patenting costs, especially the external (or internal for large firms) services. The second method involves simulating the costs from the available (and complex) fee structures. It is more straightforward than the survey approach, allows calculation of the costs for different scenarios regarding the geographical scope for protection, and makes international comparisons easier.

The adopted simulation methodology is based on the one put forward by van Pottelsberghe and François (2006). Relying on the data presented by Harhoff et al. (2008) on the share of EPO granted patents that were validated in each EPC contracting states in 2003, we consider four scenarios for the geographical scope of protection:

EPO-3: Germany (DE), France (FR) and the United Kingdom (UK) – with at least 75 percent of the patents granted by the EPO being validated in each of these counties after the grant by the EPO;

EPO-6: includes EPO-3 and Switzerland (CH), Italy (IT), and The Netherlands (NL) – the three countries with more than 30 percent of the patents granted by the EPO being enforced there;

EPO-13: EPO-6 and Austria (AT), Belgium (BE), Spain (ES), Denmark (DK), Finland (FI), Ireland (IE), Sweden (SE) – with more than 12 percent of the patents granted by the EPO being enforced there;

EPO-34: the geographical scope includes all the 34 EPC contracting states;

Due to the existence of different filing routes and differences between patent office fee structures, the following working hypotheses are made:

1. **Filing route: direct filing at the EPO**. For the sake of simplicity neither the PCT route (and hence the fees requested by the World Intellectual Property Office) nor the national priority filing fees (i.e., the fees paid at the national patent office for the priority filing that precedes the EPO application) are accounted for.

2. **No fees for SMEs, and no other special fees**. Patent offices frequently allow reductions for individual applicants or small and medium enterprises. In our analysis we do not account for those discounts. All fees that are payable during the granting process are calculated for a *standard patent application*. Moreover, we assume that all payments are made on time, thus no fines are incurred because of late payment.

3. **Patent size**. The simulations are based on the *average patent filing* in terms of the numbers of claims and pages.

4. **External expenses.** The cost of external services is difficult to measure as it depends on the complexity of the application and the quality of the requested services. Depending on the stage of the patent application, we can distinguish between three types of external expenses:

(i) *pre-filing expenses*: cost of novelty search and of drafting patent application; (ii) *representation before the patent office:* from filing the patent application up to its grant; and (iii) *post-grant expenses:* validation and maintenance in designated states. In order to approximate these arms' length costs, 11 large patent attorney companies were contacted in five countries. Their fee structures for legal advice, patent drafting and representation before patent offices (for the methodological approach see table A.4 in the Appendix) are summarised in Table 1.

To have the patent application drafted by a patent attorney, the patentee has to spend between €2,500 and €5,000. Additional pre-filing expenses usually include a novelty search (€2,500-6,500). For intermediation by the patent attorney during the application procedure, the assignee has to pay between €4,000 and 8,500. These costs vary according to the complexity of the patent. Once the patent is granted the external expenses incurred during the validation procedure (i.e. the filing of a translated patent with a national patent office) and further patent maintenance (payment of renewal fees) increase proportionally to the number of countries in which the applicant wants to have its patents enforced. This is due to the fact that most of the national patent offices require a patentee to use a professional representative. Representation by an attorney for the filing of a patent may cost the applicant up to €3,000 when seeking protection in six countries (i.e., about €500 per market). The basic maintenance services (i.e. payment of renewal fees) are on average €2,560 (with six states for protection from the 6th up to 10th year from the priority date), or about €110 annually per country.

Table 1: Value of external expenses associated with a patent application, its prosecution and its validation and maintenance in six countries, as of August 2008[1]

	Average	Median	Min	Max
PRE-FILING				
Novelty search and draft	**8,125**	**8,125**	**5,000**	**11,250**
PROCEDURAL (up to grant)				
Representation	2,556	2,500	1,740	3,500
+ 10h of attorney's work	5,056	5,000	4,240	6,000
+ 20h of attorney's work	**7,556**	**7,500**	**6,740**	**8,500**
POST-GRANT				
Validation [2]	**2,904**	**3,180**	**2,040**	**3,600**
Maintenance (6th-10th)	**2,560**	**2,520**	**2,400**	**2,880**
TOTAL:	**21,120**	**21,295**	**16,158**	**26,199**

(1) The cost of translation is not accounted for, as it constitutes a separate cost category in our analysis. (2) Validation includes filing translation and taking over representation by the attorney company. Source: Own calculations from raw data provided by 11 patent law firms, for the methodological approach cf. Appendix Table A.4.

5. **Time spent pending** is defined as the lapse between the date of filing and the date of grant of a patent. All patent offices, except the USPTO, require the applicant to officially request the examination. The deadline for filing the examination request varies across patent offices, ranging from 18 months after the priority date at the EPO to up to five years at the Australian

Patent Office (AU-PO)[12]. We assume that there is no substantial delay due to the strategic behaviour of applicants and that the request for substantive examination is filed once the search report is published (generally 18 months after the priority date).

6. **Translation requirements**. Since the entry into force of the London Agreement, translation requirements have been drastically reduced in the signatory countries. The new conditions are illustrated in figure 2 and summarised in Table 2 for four geographical scopes of protection. The table reports the number of translations required for each of the two main components of a patent, namely the claim section and the description. It is important to keep in mind that the claims still have to be translated, as was the case before the LA. The most important change has occurred for the description section (cf. Section 2).

It is worth noticing that these six working hypotheses imply that the simulated costs displayed in the present analysis are lower bounds. Neither the fees for national priority filings, nor the fees induced by the optional PCT route, nor the fees due to numerous claims and delays in responses, are taken into account in the simulations that follow.

Table 2: Required translations before and (after) the London Agreement[1]

Part of the patent	Procedural Language at the EPO	EPO-3	EPO-6	EPO-13	EPO-34
Description	EN	2 (0)	4 (1)	8 (4)	24 (16)
	DE	2 (0)	4 (2)	8 (4)	24 (16)
	FR	2 (0)	4 (2)	8 (5)	24 (17)
Claims	EN, DE, FR	2 (2)	4 (4)	8 (8)	24 (24)

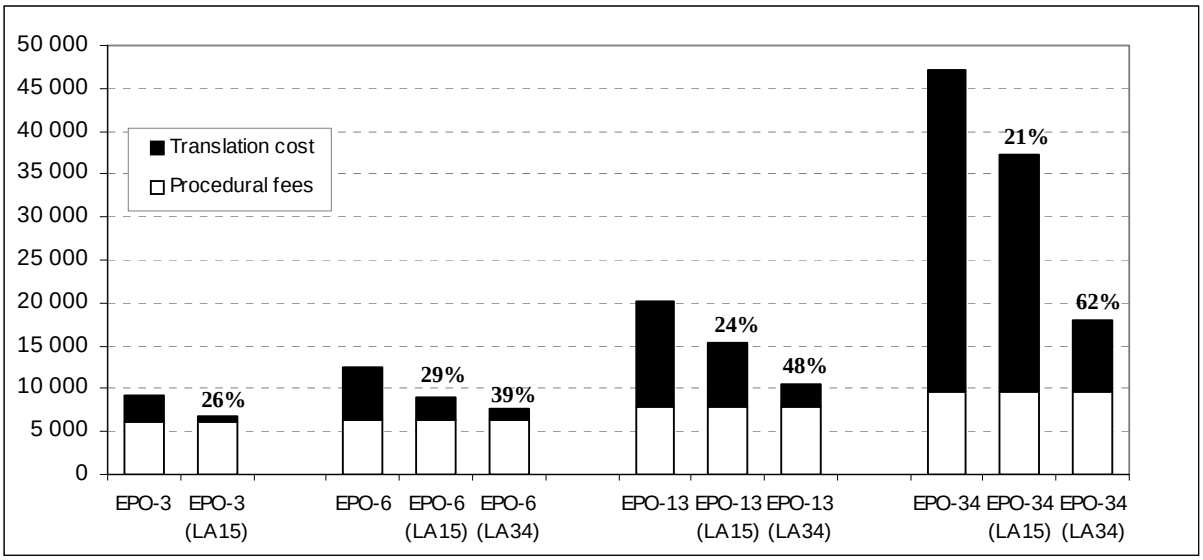
(1) The parentheses indicate the number of translations required after the entry into force of the London Agreement, from the 1st of May 2008 onwards. EPO-3 includes Germany, Great Britain and France, which have all ratified the London Agreement. EPO-6 (or -13, or -34) stands for the patents validated in the 6 (or 13 or 34) most frequently targeted countries.

3.2. Cost simulations, before and after the London Agreement

The detailed cost structures of a patent filing at the EPO, for the four main scenarios, are displayed in appendix table A.3 and graphically summarised in figure 3. The relative cost reductions are reported in table 3. In figure 3 the white area represents the cumulated fees (from filing and examination fees at the EPO, to validation fees at national patent offices) and the dark area represents the translation costs. The cost reductions that would be induced if the 34 member states ratified the London Agreement (LA34) are also illustrated. The London Agreement appears to have a clear and substantial impact, ranging from a cost reduction of 21 per cent if all member states are targeted to a reduction of 29 per cent if the patent is validated in 'only' six countries.

[12] At the Brazilian and Chinese patent offices the request must be performed within three years from the application date; in India, within four years from the application date and in Australia, Canada and South Korea five years are allowed. Since 2005 the Japanese patent office allows for a three years period to file the request of examination (previously it was seven years). Cf. Lazaridis and van Pottelsberghe (2007) for the relationship between patent size and the length of examination, and van Zeebroeck (2008) for an in-depth analysis of examination duration at the European Patent Office.

Figure 3. Cost of patents and relative savings due to London Agreement, May 2008 (in EUR)[1]



(1) The cost savings are simulated for three configurations: before the LA, after the LA in its current format, with 15 member states (LA15); and (LA34), with all EPC contracting states having supposedly ratified the London Agreement. Procedural fees include the validation fees. EPO-3 includes Germany, Great Britain and France, which have all ratified the London Agreement. EPO-6 (or -13, or -34) stands for the patents validated in the 6 (or 13 or 34) most frequently targeted countries. Cf. Figure A.1 in the Appendix for similar figures including renewal fees. Source: Based on own calculations: cf. Table A.3a in the Appendix.

Had all the member states ratified the London Agreement, we would have seen a decline of 40 to 60 percent in the cumulated procedural and translation costs, twice as much as the current reduction induced by the 15 signatory countries.

The relative cost reduction varies according to the cost components included in the total patenting costs. This is illustrated in table 3. For instance, if the focus is essentially on translation costs, the savings induced by the London Agreement ranges from 26 percent if all member states are targeted by the applicant, to 78 per cent if the geographical scope of protection is limited to three countries. For protection in six countries the translation cost decline is of a substantial 60 per cent (€3,648). If the cumulated costs include fees, translation and external legal advice and intermediation services, the cost decrease due to the London Agreement falls to 16 per cent only (for protection in six countries). When the renewal fees for 10 years of effective protection are added to translation and examination fees, the relative decrease is also smaller, around 11 percent when six countries are targeted.

Table 3: Relative cost savings due to the ratification of the London Agreement, 2008[1]

	EPO-3 (LA15)	EPO-6 (LA15)	EPO-13 (LA15)	EPO-34 (LA15)
Translation (absolute cost savings in EUR)	2,432	3,648	4,864	9,728
Translation (%)	78%	59%	39%	26%
Procedural and Translation (%)	26%	29%	24%	21%
Procedural, Translation and External Services (%)	-	16%	-	-
10Y excl. External Services (%)	21%	19%	14%	13%
10Y incl. External Services (%)	-	11%	-	-

(1) Cost saving with 15 countries ratifying the London Agreement. Procedural fees include the validation fees. EPO-3 includes Germany, Great Britain and France, which have all ratified the London Agreement. EPO-6 (or -13, or -34) stands for the patents validated in the 6 (or 13 or 34) most frequently targeted countries. External expenses include

the average cost of pre-filing, processing an application, including 20 hours of patent attorney's work and validation; novelty and search cost are not taken into account (cf. Table 2). Source: Based on own calculations: cf. Table A.3a and Table A.4 in the Appendix.

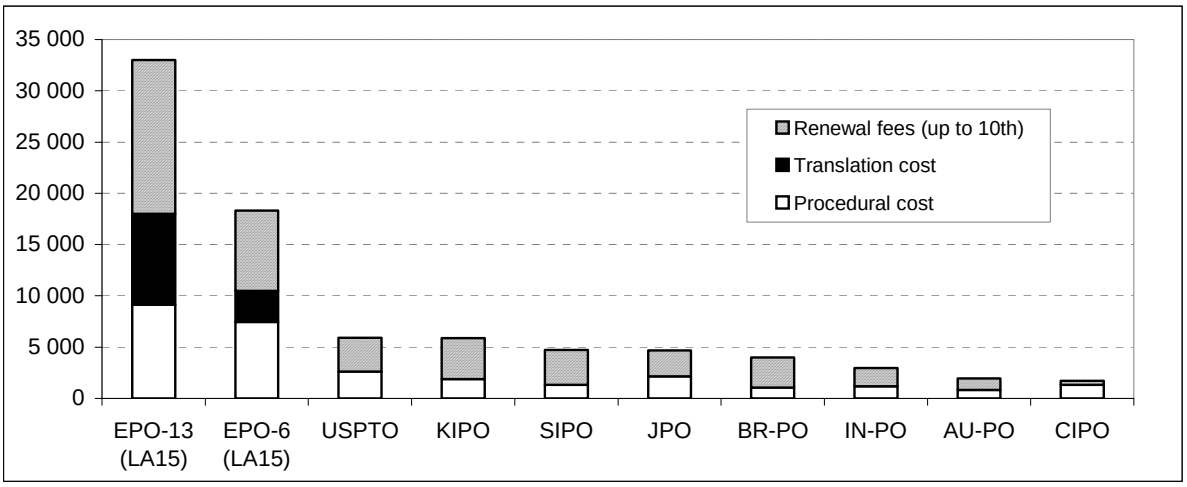
In a nutshell, the relative cost reduction varies according to the desired geographical scope of protection and the type of cost considered. If companies continue to limit their validation strategies to about six countries, the London Agreement leads to a drop of about 30 percent in the cumulated cost of patenting. This is a significant drop, and will probably substantially affect the patenting behaviour of applicants.

The level of cost reduction is quite substantial. Before the London Agreement, a firm having a patent granted by the EPO and validated in six countries (the observed average) would bear translation costs of about €6,300. Since the implementation of the LA, the costs are reduced to €2,600, resulting in total "translation" savings of about €3,700 per patent. Multiplying this cost-cutting by the number of patents granted each year by the EPO, around 60,000, yields a total saving for the business sector of about €220 million. Before analysing the behavioural consequences of the London Agreement (section 5), it is worth analysing how Europe compares with the rest of the world in terms of patenting costs.

4. International comparison

The detailed cost structures of the most important patent offices in the world are described in appendix table A3b. Figure 4 displays the major components of these costs. Despite the substantial step forward induced by the London Agreement, a European patent remains much more expensive, in absolute terms, than anywhere else in the world. The cumulated translation and procedural costs are of about 17,000 US PPPs if 13 countries are targeted and 10,000 US PPPs with six countries. In all other large patent offices the cost is about five times smaller, and fluctuates around 2,000 US PPPs. If renewal fees for a 10 year protection period are included in the cumulated costs, a European patent fluctuates between 17,000 and 35,000 US PPPs, according to the geographical scope of protection. This is to be compared with about 5,000 US PPPs or less in the USPTO and all other patent offices. In other words, ten years of protection in the US and anywhere else in the world is at least three times less expensive than having a patent granted and translated in the European patent system.

Figure 4: International comparison of cumulated patent costs, 2008 (in US PPPs)



Source: Own calculations based on the fee structure provided by the national patent offices. For the methodological approach see Appendix Table A.3a and Table A.3b. KIPO is the national patent office of South Korea, SIPO is for China, JPO for Japan, BR-PO for Brazil, IN-PO for India, AU-PO for Australia, CIPO for Canada. Cf. Appendix Figure A.2 for similar data in EUR.

This ranking may however be biased in two main respects (cf. van Pottelsberghe and François, 2006). First, patent size (in term of the average number of claims included in a patent) varies substantially across regions. For instance, Japanese patents include far fewer claims per patent (about 9.5) than the average US patent (about 23). It seems that taking the number of claims as an indicator of demand for intellectual property might be more appropriate than the number of patents, because Japan and, to a lower extent, the US and Europe have claim-based fees, which underline the importance of claims. In addition, Japanese applicants are known to merge several of their priority filings into one large application filed before the USPTO or the EPO, leading to some extent to a substitution effect between the number of patents and their size (see Dernis et al. (2001), Archontopoulos et al. (2007) and van Zeebroeck et al. (2006) for an in-depth analysis of the number of claims included in patent applications at the EPO). The second source of bias is related to the size of the market covered by the patent office. If two countries have a similar cost of patenting, but different size, the relative cost (per market unit) will logically be lower in the

larger country. Table 4 provides an evaluation of the patenting cost, i.e. procedural fees (including validation fees) and translation costs, relative to the US for all countries, before and after the London Agreement (LA15).
The first potential bias is illustrated in the differences between the first two columns. Without the London Agreement a patent (claim) is six to nine (seven to 11) times more expensive in Europe than in the US. After the London Agreement the relative difference varies from four to seven (five to nine). In other words one patent (or claim) is still at the very least five times more expensive in Europe than in the US. All other countries or regions seem to match the US costs at the patent level. At the claim level, as patents in Asia are generally smaller than in the US the costs are slightly higher than in the US, but are far from the prohibitive costs of Europe.

Table 4: Procedural and translation costs relative to the US, 2008

	Per patent	Per claim	Per capita	3C-index[1]
EPO-13	9.0	11.4	7.3	9.2
EPO-6	5.6	7.1	6.0	7.5
EPO-13(LA15)	6.9	8.7	5.6	7.0
EPO-6 (LA15)	4.0	5.1	4.2	5.4
JPO, Japan	0.8	2.0	1.9	4.7
KIPO, South Korea	0.7	1.7	4.5	10.8
SIPO, China	0.5	1.2	0.1	0.3
CIPO, Canada	0.5	0.6	4.6	5.3
IN-PO, India	0.4	1.0	0.1	0.3
BR-PO, Brazil	0.4	0.9	0.6	1.5
AU-PO, Australia	0.3	0.4	4.5	5.1

(1) 3C-index refers to the cost per claim per million capita. Source: cf. Table A.3a. A3b and A.2 in the Appendix, own calculations.

The second correction, accounting for market size, is shown in the third column. Despite the implementation of the London Agreement the patent cost per capita in Europe is 4 to 6 times higher than in the US but is comparable with Australia, Canada and South Korea. In China and India, the markets with the largest population, the cost per capita is the lowest (10 times lower than in the US).

The simultaneous correction for the two sources of bias is illustrated in the last column of table 4, with the 3C-index (the cost per claim per capita) of all offices with respect to the US index. After the implementation of the LA, the 3C-index for the European patent validated in six countries seems to match Australia, Canada and Japan and is five to eight times higher than in the US. In China and India the index is three times lower than in the US.

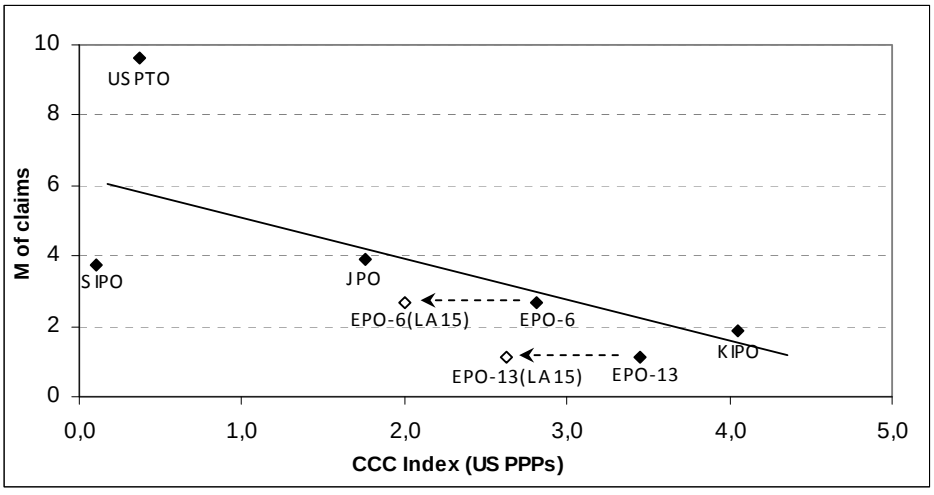
In a nutshell, despite the savings on translation costs induced by the London Agreement, the relative cost of a European patent validated in six (thirteen) counties is still five (seven) times higher than in the US.

5. Potential impact on the demand for patents

The likely impact of the London Agreement on the patenting behaviour of applicants is twofold. On the one hand the cost reduction of about 30 per cent may induce firms to file more applications at the EPO, while keeping an average target for validations of about six countries on average per patent. On the other hand, as the cost reduction concerns the translation requirements, one may also expect companies to validate their patent in more countries. The actual effect will likely fall between these two opposite impacts, with an increase in both the number of patents and the number of countries of validation each year. The remainder of this section subsequently investigates the two potential effects in the light of recent quantitative findings.

Let us first assume that, due to the high level of renewal fees in each EPC member state, applicants will continue to limit their geographical scope of protection to six countries on average. In this case, the cost reduction induced by the London Agreement will essentially affect the number of patent applications at the EPO. Figure 5 plots the number of claims filed at patent offices with respect to their relative costs. The horizontal axis represents the cost per claim per million capita (in US PPPs) and the vertical axis represents the number of claims (in millions) filed at the most important patent offices in the world in 2006. Relative costs are logically smaller in the largest geographical areas, such as China or the United States. If one focuses on the largest patent offices in countries with a similar level of economic development (the US, Japan, South Korea and Europe), a demand curve appears, with a high demand for patents in the least expensive patent offices (e.g., in the United States) and a lower demand in the regions where the relative patenting costs are higher (i.e., in Europe and South Korea).

Figure 5: The 3C-index and the demand for patents[1]



(1) The x-axis shows the cost per claim per million capita, expressed in US PPPs for the year 2006. The cost corresponds to the process fees up to the grant, validation fees and translation costs. The y-axis shows the total number of claims filed in 2006 in each patent office (with at least one million claims filed in 2006). Cf. table 4 for the abbreviations. Source: cf. Table A.2, Table A.3a, Table A.3b and Table A.3c in the appendix, own calculations.

This graphical illustration suggests that the fee elasticity of patents is negative and substantial. In order to have a more precise evaluation of the fee elasticity of patents, a quantitative analysis

must be performed. But to the best of our knowledge few or no estimates have been produced so far for EPO applications. A few studies, summarised in table 5, have estimated fees elasticities of the demand for patents. They have been derived either from an event analysis (the US increase in claim-based fees in December 2004) or from cross country econometric studies. The estimates actually range from -0.5 to -0.2, witnessing an 'inelastic' demand curve (the relative impact on the demand for patents is smaller than the relative change in fees). Assuming a fee elasticity of patents of -0.4, the impact of the 30 (or 20) percent drop in the cost of patenting would lead to a 12 (or eight) percent increase in the demand for patents, everything else being equal. In other words, as the EPO receives more than 100,000 patents each year (including EP direct application and PCT filings in regional phase), one would expect a net increase of more than 10,000 patents[13]. Such a claim on the future should, however, be considered with a high level of caution. Indeed, the London Agreement induces an important structural change in the European Patent System, which may actually influence the fee elasticity of the demand for patents, as suggested by Ericsson et al. (1998).

Table 5: Estimated fee elasticities of the demand for patents in the literature

Authors	Data and method	Estimated elasticity
Archontopoulos et al. (2007)	Event analysis of the claim-based fees increase in the USA implemented in December 2004.	-0.2
de Rassenfosse and van Pottelsberghe (2007)	Cross-country analysis of the determinants of priority filings, including 29 EPC Member States.	-0.5 to -0.3
de Rassenfosse and van Pottelsberghe (2008)	Cross-country analysis of the demand for priority filings, including 34 patent offices.	-0.5 to -0.3
de Rassenfosse and van Pottelsberghe (2008b)	Time series analysis of 25 years of patenting in the USA, Japan and Europe.	-0.4
Harhoff et al. (2007)	Cross section analysis of bilateral validation behaviour between EU countries. Negative impact of high translation costs dummy, and negative impact of cumulated validation and renewal fees.	-0.4

The second likely effect of the London Agreement is to increase the average number of targeted countries per patent. Harhoff et al. (2007) have analysed this issue with a gravity model that aims to explain patent flows between applicant and target countries within the European patent system. The results show that the size of countries, their wealth and the distance between their capital cities are significant determinants of patent flows. Validation fees and renewal fees further affect the validation behaviour of applicants. Translation costs seem to have an impact as well, especially in countries with high translation costs. The marked effect of validation and renewal fees (which are not affected by the LA) suggest that the aggregate effect of the London Agreement will be on both the number of patents filed at the EPO and on the number of countries of validation per patent. In their companion paper, Harhoff et al. (2008) rely on a probabilistic model to understand the probability of validating a patent in each member state. The authors' simulations suggest that the number of patent validations induced by the London Agreement will increase by about 20 percent, i.e., more than 50,000 additional patents.

[13] Such an increase will probably not occur in 2008 and 2009, due to the current inflationary pressures and economic slowdown, which have a more important impact on the propensity to patent than fees (see de Rassenfosse and van Pottelsberghe, 2008).

6. Concluding remarks

This paper has analysed the potential consequences of the recently ratified London Agreement, which reduces the patent translation requirements in 15 out of 34 EPC Member States. The simulations suggest that the cumulated costs of patenting have been reduced by 20 to 30 percent thanks to the coming into force of the London Agreement, in May 2008. The relative drop depends on the number of countries targeted for protection and on the type of costs considered. If external expenses and renewal fees for protection for 10 years are considered, the drop is only about 11 percent of total costs.

In nominal terms, for the average patent which targets six countries for protection, the cost savings are about 3,600 EUR. Given the fact that the EPO grants about 60,000 patents each year, the total saving for the business sector is about €220 million. As well as these substantial cost savings, one may expect an increase in the demand for patents of eight to 12 percent, everything else being equal.

It is important to keep in mind that translation costs still have to be supported for the claims' section of a patent, and that cumulated (over the number of countries targeted for protection) national validation and renewal fees outperform by far the renewal fees observed elsewhere. Despite the substantial reduction induced by the London Agreement, the relative cost of a European patent is still at least four times higher than in the US (and any other large national patent office). With a larger geographical scope for protection the relative cost of a patent in Europe could increase up to ten times the cost of a US patent.

The question that directly pops up when these results are considered is whether these factors affect the behaviour of applicants, and if yes, whether it is good or bad for patent systems. On the first question, the evidence suggests that the propensity to patent is affected, although through an inelastic price elasticity of -0.4. Is this then good for the patent system? A more expensive patent is not particularly bad for an economy, provided it correlates with the quality of the examination process, and provided the costs are not too prohibitive. In Europe the high costs actually constitute a prohibitive barrier to patenting, as witnessed by the relatively small attractiveness of the European market (which has only half the attractiveness of the US patent system in terms of total applications, including PCT international applications). Given the current backlog issues raised by the heads of the US, Japanese and European patent offices, one would be tempted to conclude that it is actually good for the economy, as it limits somewhat the number of applications. However, it must be kept in mind that the simulations presented in the present paper all too amply demonstrate that what makes a European patent relatively expensive is to a large extent due to the remaining translation costs and national renewal fees that must be paid in the countries targeted for protection. In other words, the high cost are no reflection on the quality of the patent system, but the managerial complexity and financial burden induced by a highly fragmented patent system.

References:

Archontopoulos E., D. Guellec, N. Stevnsborg, B. van Pottelsberghe de la Potterie, and N. van Zeebroeck, 2007, When Small is Beautiful: Measuring the Evolution and Consequences of the Voluminosity of Patent Applications at the EPO, Information Economics and Policy, 19(2),103-132.

de Rassenfosse G. and B. van Pottelsberghe de la Potterie, 2007, Per un Pugno di Dollari: A First Look at the Price Elasticity of Patents, Oxford Review of Economic Policy, 23(4), 588-604.

de Rassenfosse G. and B. van Pottelsberghe de la Potterie, 2008a, A Policy Insight into the R&D-Patent Relationship, CEPR Discussion Papers, 6716.

de Rassenfosse G. and B. van Pottelsberghe de la Potterie, 2008b, On the Price Elasticity of the Demand for Patents, CEPR Discussion Paper, forthcoming.

Dernis, H., D. Guellec and B. van Pottelsberghe de la Potterie, 2001, Using Patent Counts for Cross-country Comparisons of Technology Output, STI Review, 27, OECD, Paris.

Ericsson H., D. Hendry and G. Mizon, 1998, Exogeneity, Cointegration, and Economic Policy Analysis, Journal of Business and Economics Statistics, 16(4), 370-387.

European Commission Communication, Enhancing the Patent System in Europe, COM(2007)165 final.

Fidrmuc J. and V. Ginsburgh, 2007, Languages in the European Union: The Quest for Equality and its Cost, European Economic Review, 51 (6), 1351-1369.

Ginsburgh V., 2005, Languages, Genes, and Cultures, Journal of Cultural Economics, 29 (1), 1-17.

Guellec D. and B. van Pottelsberghe de la Potterie, 2007, The Economics of the European Patent System, Oxford University Press, Oxford, 250 p.

Harhoff D., K. Hoisl, B. Reichl and B. van Pottelsberghe de la Potterie, 2007, Patent Validation at the Country Level – the Role of Fees and Translation Costs, CEPR Discussion Paper No 6565.

Harhoff D., K. Hoisl and B. van Pottelsberghe de la Potterie, 2008, Languages, Fees and the Regional Scope of Patenting in Europe, CEPR Discussion Paper, forthcoming.

Jensen P. H., A. Palangkaraya and E. Webster, 2008, Application Pendency Times and Outcomes across Four Patent Offices, Intellectual Property Research Institute of Australia, Working Paper No 01/08.

Lazaridis G. and B. van Pottelsberghe de la Potterie, 2007, The Rigour of EPO's Patentability Criteria: An Insight into the "Induced Withdrawals", World Patent Information, 29 (4), 317-326.

Mejer M. and B. van Pottelsberghe de la Potterie B, 2008, Economic Incongruities Induced by A Fragmented Patent System in Europe, forthcoming.

Pakes A. and M. Schankerman, 1979, The Rate of Obsolescence of Knowledge, Research Gestation Lags, and the Private Return to Research Resources, NBER Working Paper 0346.

Stevnsborg N. and B. Van Pottelsberghe de la Potterie, 2007, Patenting Procedures and Filing Strategies, in Guellec, D. and B. Van Pottelsberghe de la Potterie. The Economics of the European Patent System, Oxford: Oxford University Press, Oxford, Chapter 6, p. 155-183.

van Pottelsberghe de la Potterie B. and D. François, 2006, The Cost Factor in Patent Systems, CEPR Discussion Paper 5944.

van Pottelsberghe de la Potterie B. and N. van Zeebroeck, 2008, A Brief History of Space and Time: the Scope-Year Index as a Patent Value Indicator Based on Families and Renewals, Scientometrics, 75(2), 319–338.

van Zeebroeck N., B. van Pottelsberghe de la Potterie, and D. Guellec, 2006, Claiming More: The Increased Voluminosity of Patent Applications and its Determinants, CEPR Discussion Paper, 5971.

van Zeebroeck N., 2007, Patents only live twice: a patent survival analysis in Europe, Working Papers CEB 07-028.RS, Université Libre de Bruxelles, Solvay Business School, CEB.

Annual Reports:

Canadian Intellectual Patent Office, Annual Report 2006-2007 available at www.cipo.ic.gc.ca/epic/site/cipointernet-internetopic.nsf/en/h_wr00094e.html

European Patent Office, Annual Report 2006 available at www.epo.org/about-us/office/annual-reports/2006.html

European Patent Office, Annual Report 2007 available at www.epo.org/about-us/office/annual-reports/2007.html

Indian Patent Office, Annual Report 2005-2006 available at http://ipindia.gov.in/cgpdtm/AnnualReport_2005_2006.pdf

Japan Patent Office, Annual Report 2007 available at www.jpo.go.jp/shiryou_e/toushin_e/kenkyukai_e/annual_report2007.htm

Korean Intellectual Property Office, Annual Report: Overview and Highlights of 2006 available at www.kipo.go.kr/kpo2/user.tdf

State Intellectual Property Office of the Republic of China, Annual Report 2006 available at www.sipo.gov.cn/sipo_English/laws/annualreports/ndbg2006/

Trilateral Cooperation, Trilateral Statistical Report 2006 available at www.trilateral.net/tsr/tsr_2006/

United States Patent and Trademark Office, Performance and Accountability Report. Fiscal Year 2007 available at www.uspto.gov/web/offices/com/annual/2007/index.html

Appendix

Table A.1. EPC contracting states as of May 2008

Member state	Code	Date of entry into the EPC	Date of LA	Member state	Code	Date of entry into the EPC	Date of LA
Belgium[1]	BE	7-Oct-77	23-May-08	Finland	FI	1-Mar-96	-
Switzerland	CH	7-Oct-77	6-Dec-06	Cyprus	CY	1-Apr-98	-
Germany	DE	7-Oct-77	19-Feb-04	Turkey	TR	1-Nov-00	-
France	FR	7-Oct-77	29-Jan-08	Bulgaria	BG	1-Jul-02	-
United Kingdom	GB	7-Oct-77	15-Aug-05	Czech Republic	CZ	1-Jul-02	-
Luxembourg	LU	7-Oct-77	18-Sep-07	Estonia	EE	1-Jul-02	-
Netherlands	NL	7-Oct-77	10-May-06	Slovakia	SK	1-Jul-02	-
Sweden	SE	1-May-78	29-Apr-08	Slovenia	SI	1-Dec-02	18-Sep-02
Italy	IT	1-Dec-78	-	Hungary	HU	1-Jan-03	-
Austria	AT	1-May-79	-	Romania	RO	1-Mar-03	-
Liechtenstein	LI	1-Apr-80	23-Nov-06	Poland	PL	1-Mar-04	-
Spain	ES	1-Oct-86	-	Iceland	IS	1-Nov-04	31-Aug-04
Greece	GR	1-Oct-86	-	Lithuania	LT	1-Dec-04	-
Denmark	DK	1-Jan-90	18-Jan-08	Latvia	LV	1-Jul-05	4-May-05
Monaco	MC	1-Dec-91	11-Dec-03	Malta	MT	1-Mar-07	-
Portugal	PT	1-Jan-92	-	Croatia	HR	1-Jan-08	31-Oct-07
Ireland	IE	1-Aug-92	-	Norway	NO	1-Jan-08	-

(1) On May 23, 2008 the Council of Ministers in Belgium decided to proceed with the ratification of London Agreement. Source: European Patent Office www.epo.org/about-us/epo/member-states.html

A.2. Basic figures on the largest patent offices in the world

	Abbreviation	Population (millions)	Total patent fillings (2006)
United States Patent and Trade Mark Office	USPTO	305	417,453
Japan Patent Office	JPO	128	408,674
State Intellectual Property Office of the Republic of China	SIPO	1,328	371,856
European Patent Office	EPO	581	208,202[1]
Korean Intellectual Property Office	KIPO	49	199,097
Canadian Intellectual Patent Office	CIPO	33	40,873
Intellectual Property Office Australia	AU-PO	21	32,818
Indian Patent Office	IN-PO	1,140	24,505
Brazilian Patent Office	BR-PO	192	24,230

(1) European applications filed and Euro-PCT applications entering the regional phase, 2006

Source: 2006 Annual Reports; for AU-PO and BR-PO data are taken from WIPO Statistics on Patents www.wipo.int/ipstats/en/statistics/patents/; IMF World Economic Outlook (April, 2008);

Table A.3a. Cost structure of direct patent filings and maintenance, fees as of 1st May 2008

	EPO-3	EPO-3 (LA15)	EPO-6	EPO-6 (LA15)	EPO-13	EPO-13 (LA15)	EPO-34	EPO-34 (LA15)
				Hypothesis				
Time spent in examination [2]	44	44	44	44	44	44	44	44
Average time spent	62	62	62	62	62	62	62	62
Designated counties for protection	3	3	6	6	13	13	34	34
				Procedural costs				
At the EPO:	***EUR***	***EUR***	***EUR***	***EUR***	***EUR***	***EUR***	***EUR***	***EUR***
Filing	180	180	180	180	180	180	180	180
€85 per designated state	255	255	510	510	595	595	595	595
Application fee 1st year	-	-	-	-	-	-	-	-
Application fee 2nd year	-	-	-	-	-	-	-	-
Application fee 3rd year	400	400	400	400	400	400	400	400
Application fee 4th year	500	500	500	500	500	500	500	500
Application fee 5th year	700	700	700	700	700	700	700	700
Examination	1,405	1,405	1,405	1,405	1,405	1,405	1,405	1,405
Granting (issue fee)	790	790	790	790	790	790	790	790
Claim tax [4]	640	640	640	640	640	640	640	640
Total procedural at the EPO:	**5,920**	**5,920**	**6,175**	**6,175**	**6,260**	**6,260**	**6,260**	**6,260**
At National patent offices:								
Validation fees	185	185	210	210	1,538	1,538	3,463	3,463

	EUR	***EUR***	***EUR***	***EUR***	***EUR***	***EUR***	***EUR***	***EUR***
Total procedural cost <u>without</u> translation	6,105	6,105	6,385	6,385	7,798	7,798	9,723	9,723
Total procedural cost <u>with</u> translation [5]	9,217	6,785	12,609	8,961	20,246	15,382	47,067	37,339
Renewal fees (up to 10th)	2,631	2,631	6,974	6,974	13,770	13,770	28,653	28,653
Renewal fees (11th-20th)	19,655	19,655	36,811	36,811	72,489	72,489	149,736	149,736

	US PPPs	***US PPPs***	***US PPPs***	***US PPPs***	***US PPPs***	***US PPPs***	***US PPPs***	***US PPPs***
Procedural cost <u>with</u> translation	10,780	7,936	14,747	10,481	23,680	17,991	55,049	43,671
Renewal fees (up to 10th)	3,057	3,057	7,844	7,844	15,017	15,017	40,474	40,474
Renewal fees (11th-20th)	22,828	22,828	42,085	42,085	80,569	80,569	212,132	212,132
TOTAL cost 10 years	**13,837**	**10,993**	**22,592**	**18,325**	**38,697**	**33,008**	**95,524**	**84,146**
TOTAL cost 20 years	**36,665**	**33,820**	**64,677**	**60,410**	**119,265**	**113,576**	**307,655**	**296,277**

Table A.3b. International comparison of patent cost structure, fees as of 1st May 2008

	USPTO	JPO[1]	AU-PO	CIPO	BR-PO	SIPO	IN-PO	KIPO[1]
Hypothesis								
Time spent in examination [2]	31	32	30	30	30	30	30	20
Average time spent	31	50	48	48	48	48	48	38
Designated counties for protection	1	1	1	1	1	1	1	1
Procedural costs								
At national patent office:	***USD***	***JPY***	***AUD***	***CAD***	***BRL***	***CNY***	***INR***	***KWR***
Filing	310	16,000	320	400	140	900	4,000	63,000
Search	510	-	-	-	40	-	-	-
Designated states [3]	-	-	-	-	-	-	-	-
Application fee 1st year	-	4,500	-	-	195	300	-	198,000
Application fee 2nd year	-	4,500	100	100	195	300	-	198,000
Application fee 3rd year	-	4,500	100	0	195	300	2,000	198,000
Application fee 4th year	-	13,800	100	0	195	300	2,000	297,500
Application fee 5th year	-	0	0	0	0	0	0	0
Examination	210	168,600	420	800	400	2,500	10,000	109,000
Granting (issue fee)	1,440	0	140	300	140	255	-	-
Claim tax [5]	150	38,000	0	-	0	0	0	304,000
Total procedural cost:	**2,620**	**249,900**	**1,180**	**1,600**	**1,500**	**4,855**	**18,000**	**1,367,500**
Validation fees	n.a.	n.a	n.a	n.a	n.a	n.a	n.a	n.a
	EUR	***EUR***	***EUR***	***EUR***	***EUR***	***EUR***	***EUR***	***EUR***
Total procedural cost <u>without</u> translation	1,657	1,588	681	986	568	453	304	1,074
Total procedural cost <u>with</u> translation [5]	n.a.	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Renewal fees (up to 10th)	2,081	1,885	952	277	1,578	1,156	473	2,312
Renewal fees (11th-20th)	2,473	9,023	4,038	555	4,474	6,153	2,701	12,339
	US PPPs	***US PPPs***	***US PPPs***	***US PPPs***	***US PPPs***	***US PPPs***	***US PPPs***	***US PPPs***
Procedural cost with translation	2,620	2,136	813	1,325	1,059	1,326	1,163	1,867
Renewal fees (up to 10th)	3,290	2,536	1,137	373	2,945	3,387	1,809	4,018
Renewal fees (11th-20th)	3,910	12,138	4,824	745	8,351	18,028	10,338	21,448
TOTAL cost 10 years	**5,910**	**4,672**	**1,950**	**1,697**	**4,004**	**4,713**	**2,972**	**5,886**
TOTAL cost 20 years	**9,820**	**16,810**	**6,775**	**2,442**	**12,355**	**22,741**	**13,310**	**27,334**

Source: Fee structures are published on patent office websites; own calculations. Cf. main text for working assumptions and the remarks that follows.

Remarks:

(1) At JPO and KIPO the annual fees for the first three years must be paid all together at the grant of a patent as a lump sum constituting the registration fee. At KIPO registration fees are due within three months of the date of receipt of grant notice. At JPO for all patents granted according to the new Japanese patent law (from the 1st of January 1996 onwards), the due date for annual fees is the date of grant (registration). Apart from the fixed filing fee of 38,000 KWN when applying to the KIPO an applicant has to pay a surcharge of KWN 1000 for each page of description, drawing and abstract. To approximate the value of application fee we apply estimations on the average size of the Korean patent submitted to the EPO Archontopoulos et al., 2007) to be 25 pages: 15 pages of description and 7 pages of drawings and 3 pages of claims.

(2) For the EPO, JPO and USPTO, data on time spent in examination comes from the Annual Report of the Trilateral Cooperation (2007), for the KIPO from KIPO Annual Report (2007). Due to the lack of data for other patent offices we assume the average patent time spent in examination of 30 months.

(3) The average number of claims in the Japanese office was 9.5; 18.2 at the EPO and 23 at the USPTO. To the best of our knowledge the data for remaining patent offices is not available. From informal interaction with patent attorneys, it is fair to assume the following for the average number of claims in the remaining offices: 20 at AU-PO and CIPO, and 10 claims on average at BR-PO, SIPO, IN-PO. As presented in the table, those values correspond to the maximum number of claims that are tax-free. Due to the similarities between KIPO and JPO we assume an average number of 9.5 claims for KIPO (cf. Table A.3c)

(4) Following the European Commission Communication COM (2007) 165 final, we assume translation costs of €76 per page of description and €85 per page of claims. We calculate the cost of translation for the 'average' European patent of 25 pages: 15 pages of description, 4 pages of claims and 6 pages of drawings (for comparison see: Archontopoulos et al., 2007 and Roland Berger, 2005). The number of translations required before and after London Agreement is provided in the Table 2.

Table A.3c. Average number of claims and value of claim based taxes, May 2008

	Currency	Cost per claim above (x) claims	Average no of claims	Working hypothesis
AU-PO	AUD	100(20)	n.a.	20
BR-PO	BRL	19 (10)	n.a.	10
CIPO	CAD	*not applicable*	n.a.	20
EPO	EUR	200 (15)	18.2	18.2
IN-PO	INR	400(10)	n.a.	10
JPO	JPY	4000 (per claim)	9.5	9.5
KIPO	KWR	32000 (per claim)	n.a.	9.5
SIPO	CNY	150(10)	n.a.	10
USPTO	USD	50(20)	23	23

Source: Fee structure provided by the patent offices; Average number of claims adopted from: JPO Annual Report (2007).

Table A.4. Structure of patent attorney's fees calculated for protection in six designated countries, May 2008[1]

	C1	C2	C2	C2	C3	C4	C4	C4	C5	C5	C5
PRE-FILING[2]											
Novelty search	2,500-5,000										
Draft	2,500-6,250										
Total:	**5,000-11,250**										
PROCEDURAL (up to grant)											
Filing with the EPO	630	750	750	700	850	830	590	800	570	1,200	1,650
Claim tax[3]	100		90	50	240			30	30		
Designation of inventor(s)[4]	130	100	200		160		240				
Search fees[5]	90	650	180	200	260		120		180		
Request of examination	330	200	300	270	400	830	120	560	280	480	580
Designation states[6]	520	300	480	300	510				240	190	
Grant[7]	350	200	310	520	410	144	120	400	400	990	820
EPO application fee	600	300	300	270	450	250	550	250	320	450	450
Total representation:	**2,750**	**2,500**	**2,610**	**2,310**	**3,280**	**2,054**	**1,740**	**2,040**	**2,020**	**3,310**	**3,500**
+ 10h of work[8]	**5,250**	**5,000**	**5,110**	**4,810**	**5,780**	**4,554**	**4,240**	**4,540**	**4,520**	**5,810**	**6,000**
+ 20h of work	**7,750**	**7,500**	**7,610**	**7,310**	**8,280**	**7,054**	**6,740**	**7,040**	**7,020**	**8,310**	**8,500**
POST-GRANT											
Taking over representation	840	2,400	-	1,200	-	-	3,600	-	-	1,380	-
Filing patent translation	1,200	900	-	1,200	-	-	-	-	-	1,800	-
Total validation:	**2,040**	**3,300**	**-**	**2,400**	**-**	**-**	**3,600**	**-**	**-**	**3,180**	**-**
Maintenance (6th-10th):[9]	**2,400**	**2,400**	**-**	**2,520**	**-**	-	**2,880**	-	-	**2,600**	**-**

Remarks:

(1) 30 randomly selected patent attorneys in Europe were asked to provide their fee schedule. Eleven companies from five different countries (Belgium, Germany, France, The UK and Sweden) sent their own fee schedule. The name and country of origin are not reported due to confidentiality restrictions.

(2) Novelty search involves between 10 to 20 hours of patent attorney's work whereas draft of an application requires about 10 to 25 hours of patent attorney's work. Adopting from Roland Berger (2005), we assume the hourly charges for patent attorney's work equal to €250.

(3) Claim tax is paid for each claim in excess of 15. The average number of 18 claims is taken for the standard patent application at the EPO.

(4) There are on average two inventors per patent.

(5) Search fees include: payment of search fee, forwarding the search report, watching its publication, reporting on the term for requesting examination and forwarding the published specification.

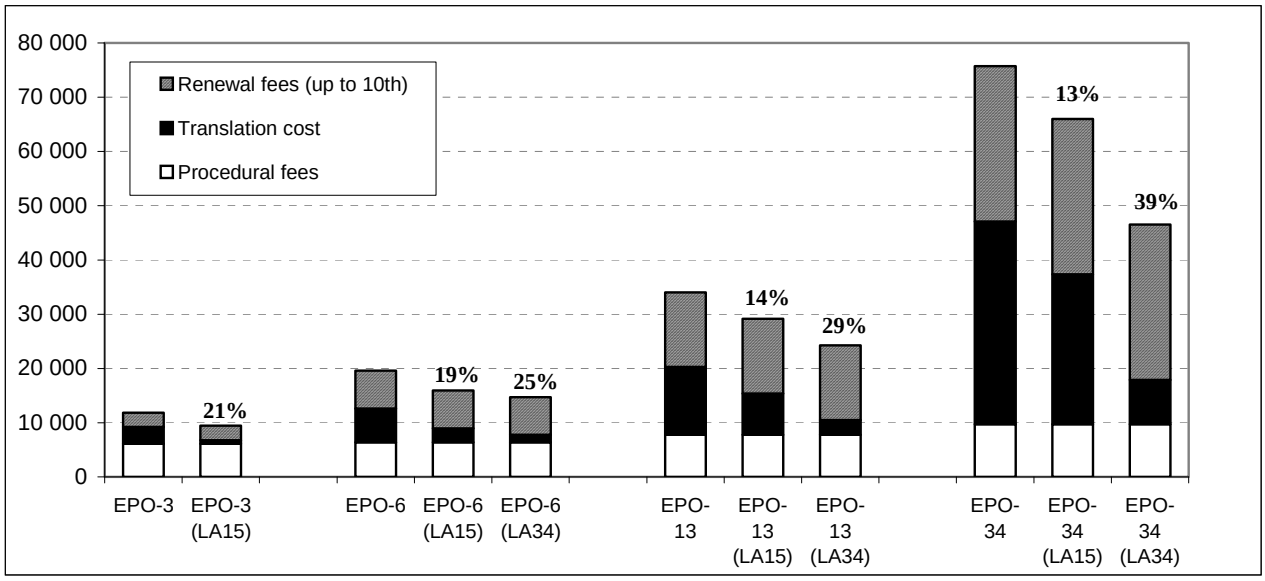
(6) The patent attorney office charges for each designated state up to seven.

(7) Grant consists of actions such as: seeking instructions on countries to be proceeded with in national phase, filing translated claims and paying grant and print fees.

(8) Additionally to the standard procedural charges, it is assumed that patent attorneys spend between 10 and 20 hours on action such as specification preparation, drawing modifications, analysing search report and examination prosecution.

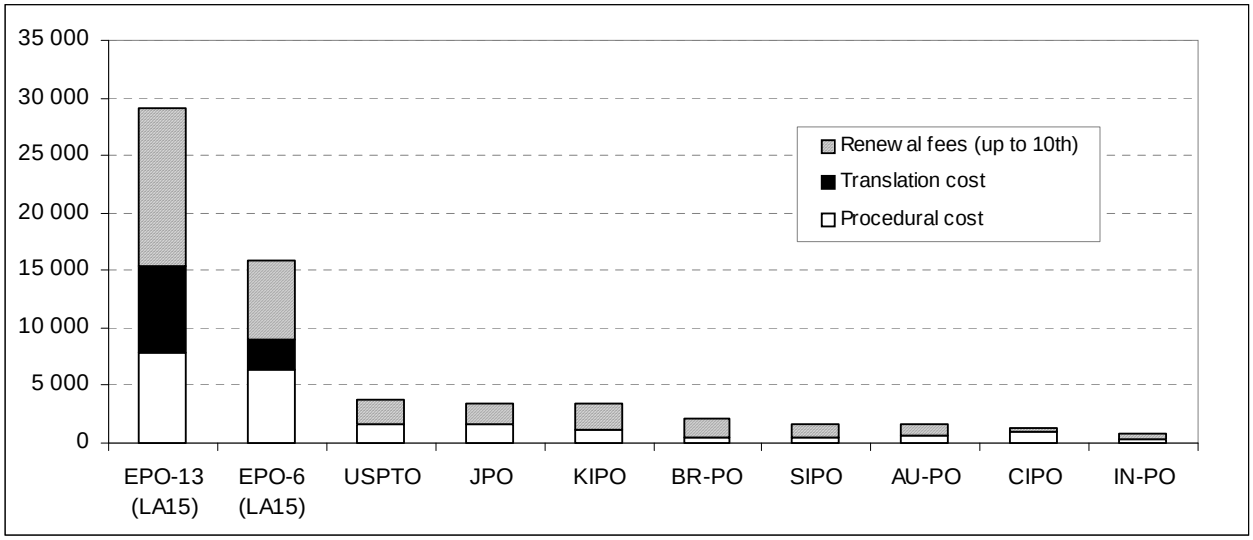
(9) Fees for paying annual renewal fees per member state per year are assumed to be the same across designated states as indicated for the county where the attorney's office is based. Local associates charges are not accounted for here.

Figure A.1: Relative cost saving of 10 years of protection due to the implementation of the London Agreement, May 2008 (in EUR)[1]



(1) The cost savings are simulated for three configurations: before the LA, after the LA in its current format, with 15 member states (LA15); and (LA34), with all EPC contracting states having supposedly ratified the London Agreement. Procedural fees include the validation fees. EPO-3 includes Germany, Great Britain and France, which have all ratified the London Agreement. EPO-6 (or -13, or -34) stands for the patents validated in the 6 (or 13 or 34) most frequently targeted countries.
Source: Based on own calculations: c.f. Table A.3a in the Appendix.

Figure A.2: Comparative cost structure of 10 years patent maintenance, 2008 (in EUR)



Source: cf. Table A.3a and Table A.3b in the Appendix.